Article

Coronavirus and the effects on UK GDP

How the global coronavirus (COVID-19) pandemic and the wider containment efforts are expected to impact on UK gross domestic product (GDP) as well as some of the challenges that National Statistical Institutes are likely to face.

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1 . Executive summary

Forecasters expect the coronavirus (COVID-19) pandemic to lead to a contraction in the UK and global economy this year, reflecting how it has led to a reduction in the demand for goods and services and the impact on the ability of businesses to supply those products. The impact is expected to reflect the length of the pandemic as well as the public health restrictions imposed and other voluntary social distancing measures. The response to COVID-19 will also impact on the ability of National Statistical Institutes (NSIs) to compile estimates of gross domestic product (GDP), inflation and the labour market. We are responding to these challenges so that we capture the economic activity of the UK in line with the latest international guidance.

In this article, we describe how those transactions that are most likely to be impacted by the pandemic will be reflected in the production, income and expenditure measures of GDP (Section 3), including how we have reflected this accordingly in our volume-based estimates of health and education output (Section 4). We also explain how we have been carrying out research on these topics to provide the most informed estimates available at this stage.

We explain how we propose to treat the Coronavirus Job Retention Scheme (CJRS) and Self-Employment Income Support Scheme (SEISS) in the UK National Accounts and the public sector finances (Section 5). This follows the latest international guidance and will feature as part of the production and income approaches to measuring GDP.

We outline the significant practical challenges that we expect to face in compiling GDP this year, including producing imputations and forecasts, carrying out seasonal adjustment, and the process of deflation. We then propose how we will look to tackle some of these considerations, building on the lessons learned from compiling GDP through the 2008 to 2009 global financial crisis (Section 6).

2 . Background

More about coronavirus

- Find the latest on coronavirus (COVID-19) in the UK.

- All ONS analysis, summarised in our coronavirus roundup.

- View all coronavirus data.

- Find out how our studies and surveys are serving public need.

The first case of the coronavirus (COVID-19) was reported to the World Health Organization (WHO) in December 2019 and was subsequently declared a public health emergency of international concern (PHEIC). This global pandemic is now expected to impact on the economic outlook for some time to come.

The latest available business surveys in the UK and real-time indicators point to a significant decline in economic activity, while the initial estimates for other countries highlight the extent of the impacts so far on the real economy.

The UK National Accounts provide a consistent framework to understand these impacts, offering an integrated description of all economic activity that takes place within the UK – including gross domestic product (GDP). This article is aimed at those with some background knowledge of the national accounts. The aim is to explain how we expect COVID-19 to affect estimates of UK GDP in theory and in practice.

Section 3 provides a theoretical framework for understanding how GDP may be impacted, reflecting some the most recent literature. Section 4 and Section 5 include an overview of the main conceptual points for how we record estimates of GDP, which are more technical in nature. Section 6 explains the practical challenges that National Statistical Institutes (NSIs) are expected to face in compiling GDP this year and how we are responding.

We have produced additional articles that explain how COVID-19 is impacting on the production of our estimates of inflation and the labour market, which also feed into the compilation of the UK National Accounts. We will also explain in a forthcoming article how this will then impact on how we reconcile our full range of productivity estimates. We will be publishing further articles in June that will cover how any effects will be treated in the institutional sector accounts and the UK Balance of Payments to provide a holistic picture of the theoretical and practical effects of how we measure the UK economy.

3 . The circular flow of income

The International Monetary Fund (IMF) forecasts a fall in the UK and global economy this year that would be larger than the declines experienced in the 2008 to 2009 global financial crisis. This reflects how "infections reduce labour supply", how "quarantines, regional lockdowns, and social distancing ... curtail mobility" and the fact that "workplace closures disrupt supply chains and lower productivity". It also highlights how the effects of "layoffs, income declines, fear of contagion, and heightened uncertainty" will weigh on gross domestic product (GDP).

The Resolution Foundation has highlighted that it is "the duration of the outbreak, the public health restrictions imposed to contain the spread of the virus, and other voluntary social distancing measures that people take to reduce their chances of catching it" that determine the initial economic impacts. These considerations are also a helpful reference point to trace through the effects of a phased re-opening of the UK economy, which will show up accordingly in our estimates of GDP.

This reflects how these affect the circular flow of income, which captures the three approaches to measuring GDP. In theory, these are equivalent to one another. The three approaches are:

- production: this is the value of the output of goods and services that are produced, less the intermediate inputs used in their production, plus any taxes net of subsidies on those products

- income: this records the value of income that is generated by the sales of production of goods and services, plus any taxes net of subsidies on production and products

- expenditure: this is the value of the sum of all final expenditures (less imports) within an economy

Based on recent external studies[1], we look at the anticipated economic impacts of the coronavirus (COVID-19) on the UK through the framework of the national accounts. This is to explain how these effects would be recorded in the production, income and expenditure estimates of GDP.[2] As such, these are not to be considered as forecasts but rather as illustrative examples, particularly as COVID-19 has led to a sharp change in the structure of production, income and expenditure so there will be much uncertainty around how this may play out in practice. We will provide a more informed picture of the impacts when these are published.

Production

It is expected that there will be lower levels of production in response to the lower demand for goods and services in the UK, which will be reflected in falling sales and in turn business closures.[3] There will also be reduced levels of employment and hours worked[4], as labour supply will also be impacted by employees voluntarily and involuntarily staying at home. Production processes for many industries are highly integrated in the global economy so the disruption to, and in many cases breakdown of, supply chains will likely lead to lower production. However, there may be some industries that also experience an increase in production in response to COVID-19.

There will be some industries that are more exposed to the COVID-19 pandemic, specifically those that are most impacted by the restrictions in place and the social distancing that is being undertaken. In the service industries, the impact will be widespread. Recent analysis highlights how previous pandemics have shown that "travel, hospitality, tourism, and face-to-face retail services are especially vulnerable, as are industries where employees have to work in close quarters", which reflect those industries that are most exposed to the effects of social distancing.

Those that require direct contact between consumers and service providers and/or those instances where there are enforced closures of those non-essential businesses and venues will be most impacted, such as taxi drivers and hairdressers. The restrictions on movement will also have a pronounced effect on travel (road, rail, sea and air). The cancellation of many sporting events and the closure of theatres and cinemas will have an adverse impact on recreational services. There may be some service industries or parts of industries that will see an increase in activity, including those restaurants that have switched to take-away services or e-learning providers that may have seen an increase in demand for online training.

The construction industry is also expected to be impacted by containment measures that have affected labour availability, as it will be unlikely that a significant proportion of these workers will be able to work from home. It is expected that the most adversely affected parts of the manufacturing industry will be those that are exposed to global value chains, those that are labour-intensive and/or those that are more export-intensive, given the expected slowdown in the global economy. However, there may also be an increase in demand for some manufactured goods, such as those of pharmaceutical products and medical equipment. There may also be an initial response to any increased levels of stockpiling undertaken by households and businesses, which could see an increase in output (for example, food retailers[5]) or drawn from businesses' inventories.

The UK economy has a large financial services industry. Any impact on its output will reflect any change in the explicit and implicit charges by financial intermediaries[6] as well as the volume of these financial transactions. The scale and volatility of these movements may be more pronounced given how financial conditions have evolved of late as well as the fiscal and monetary response. We will explain the effects on the financial economy in a later article that covers how COVID-19 may be expected to impact on the institutional sector accounts.

Income

Any adverse impact of COVID-19 on the demand and supply of goods and services in the UK economy will lead to lower use of labour and capital inputs in the production process at the headline level. A fall in the levels of employment and hours worked will lower compensation of employees – specifically the payment of wages and salaries. There may also be an easing in earnings growth from any increase in the level of slack in the labour market. Any reduction in capital income will be reflected in the gross operating surplus (GOS), reflecting the fall in company profits. There would be a fall in mixed income, which captures the returns to the self-employed, if such activity is also impacted. The impacts of the Coronavirus Job Retention Scheme (CJRS) and the Self-Employment Income Support Scheme (SEISS) on income are covered in Section 5.

Expenditure

Household consumption would reflect how non-essential spending is expected to be lower. The closures of shops and voluntary restrictions on movements are expected to weigh on some types of spending, while it is expected that those transactions that require direct contact between consumers and businesses will be impacted. There may also be a change in the profiling and composition of consumer spending, reflecting the behavioural responses of households to COVID-19. Any adverse impact on consumer confidence may lead to an uptick in precautionary savings, if incomes are retained.

Businesses may be expected to reduce their capital expenditure and cancel existing orders, given the heightened levels of uncertainty and any tightening in financial conditions. Investment may be impacted because of the lack of construction activity and the ability to import capital goods. There may be some initial building up of certain types of inventories by businesses amid concerns of restrictions on the international movement of intermediate inputs, though there may be a process of de-stocking or write-offs later in the year.

The fact that COVID-19 is a global pandemic would be expected to impact on gross trade flows, reflecting the projected lower levels of external demand and any reduction in the trade intensity of demand. The impact on domestic demand will also impact on import volumes. Government consumption in some areas may be higher in response, most notably a considerable change in health spending (see Section 4).

Notes for: The circular flow of income

1. The Office for Budget Responsibility finds that GDP may fall by as much as 35% in its "reference" scenario. The National Institute of Economic and Social Research estimates that the fall could be between 15% and 25%, and the Organisation for Economic Co-operation and Development (OECD) estimates are at the top end of this range.

2. There may also be impacts on home production activities that do not fall within the production boundary. These would not be captured in estimates of GDP, such as cooking, caring for children or home repairs.

3. This is corroborated by the findings from the latest Business Impact of Coronavirus (COVID-19) Survey (BICS).

4. Furloughed workers will be classified as remaining in employment, while their hours worked will fall to zero. It would still be expected that there are impacts on the UK employment and unemployment rate.

5. The latest retail sales figures recorded a sharp increase in food sales, in line with stockpiling by households.

6. Financial intermediaries charge for their services explicitly via commissions and fees, but there is also an implicit charge reflected by the interest margin. This captures how financial intermediaries pay lower rates of interest to those who lend them money but charge higher rates of interest to those who borrow from them. Financial intermediation services indirectly measured (FISIM) is calculated as the difference between the effective rates of interest payable and receivable as well as a "reference" rate of interest that reflects the pure cost of borrowing funds.

4 . The treatment of non-market output in GDP

The national accounts provide a conceptual and practical framework for recording and reconciling different economic flows. Market transactions of goods and services are well represented by this framework. However, non-market output has long been recognised as a measurement challenge and is one that is likely to be impacted considerably by the coronavirus (COVID-19) pandemic. Non-market output comprises the production of goods and services by the government or non-profit institutions serving households (NPISH), either supplied for free or at prices that are not economically significant. In the UK, this includes most healthcare and education provision.

Estimating the value and volume of these services is challenging, as there is typically no market price for which this output is sold. For health and education output, we follow international guidance and produce volume estimates based on cost-weighted activity. These depend on direct volume measures – such as the number of students in different educational settings and the reported number of patients treated for various conditions. These are in turn weighted by their cost per unit. However, traditional "activity" measures are clearly likely to be challenged by the COVID-19 pandemic, reflecting the pandemic itself and as a result of the policy response.

Health

The volume of healthcare output in the UK is estimated using available information on the number of different kinds of activities and procedures that are carried out in a period and weighting these by the cost of each activity. This means that additional high-cost activities – including complex surgeries and treatments – will add more to aggregate healthcare output than additional low-cost activities, which include relatively simple treatments or consultations.[1]

The impact of COVID-19 on total healthcare output is likely to be complicated. The rise in the number of critical care cases is likely to increase healthcare output, as this is among some of the most high-cost care provided by the health service. The increase in patient cases will push up aggregate healthcare output. Similarly, the increase in the number of calls to telephony and visits to online services such as NHS 111 will also have an impact, albeit to a much smaller extent because of their relatively lower cost. However, these upwards pressures are likely to be offset by reductions in activity elsewhere in the healthcare system that were introduced in part to limit the spread of COVID-19 and in part to create spare capacity to prepare for a wave of further cases. For example, the suspension of dental and ophthalmic activities (almost 6% of healthcare output), the cancellation and postponement of outpatient activities (13% of healthcare output), and elective procedures (19% of healthcare output) will likely weigh heavily on our activity figures.

Measuring these effects is also likely to involve complicated practical considerations. For example, the quarterly activity estimates are only made available with a lag, necessitating a form of activity nowcasts. While we will work with data suppliers to ensure that our data are as accurate as possible, it seems likely that our healthcare activity estimates will be subject to larger than usual revisions in coming months, as we replace our nowcasts with outturn data. Further, our estimates may be affected by the suspension of some data collections by the NHS in England, which include patient volumes in critical care in England. Where it is appropriate and possible, we will work to introduce innovative methods to bridge the gaps in these collections, using proxy indicators to estimate the likely number of cases. We will use the available monthly figures to inform our estimates for the latest quarter. For instance, our estimate for GP activities in England will be informed by experimental monthly figures. To estimate the number of hospital surgical procedures in England within the latest quarter, we will refer to monthly estimates for January and February and make informed judgements about March. We will be transparent about the basis of these estimates. However, this is also likely to lead to larger than usual revisions. Finally, the construction and equipping of the Nightingale hospitals across the UK has involved considerable effort and resource. However, our volume indicators[2] capture the patients who are treated by these facilities. Our approach considers "treated patients" to be activity and output, rather than the establishment of facilities that enable that treatment.

Education

The volume of education output is produced by weighting the number of full-time equivalent students in different educational settings by the costs of educating the students in that setting. This captures changes in the number of students educated while holding relative costs constant. We cover eight educational settings, of which primary, secondary and academy education carry the largest numbers of students.

The closure of schools across the UK as part of the policy response to the COVID-19 pandemic presents several conceptual and practical challenges for this measurement approach. Our activity measures – the number of students in different settings – have been significantly affected. In "normal" times, our estimates of student numbers are provided by the school censuses in England, Scotland, Wales and Northern Ireland, generally once per year.

As these data do not adequately reflect the number of students attending school settings, work is underway to create equivalent quarterly estimates using the data published by the Department for Education, the Scottish and Welsh Governments, and the Northern Ireland Assembly. These efforts should enable our measures to capture the fall in activity in school settings from general provision to that focussed on key workers and vulnerable children.

However, by only capturing the fall in the number of students attending schools, this will overstate the fall in education services provided because of the way that schools have moved to provide remote instruction. The empirical impact of this change in approach is likely to be shaped by two offsetting factors.

First, to the extent that instruction can be provided remotely, the "true" volume of education services will be higher than measured by our traditional activity indicators. Classes that are taught remotely, instruction that is provided online, and work that is set and marked remotely – in some settings, particularly for older students – may adequately substitute for more normal arrangements. In other settings, particularly those for younger students in which the balance of output is tilted towards childcare as compared with education services, the current arrangements are unlikely to replicate normal levels of provision. On balance, these effects would tend to push up the volume of education delivered compared with our school-attendance-based activity metrics.

Secondly, international guidance in this area also makes it clear that instruction provided by parents or guardians in the home – such as formal homeschooling – sits outside the production boundary. As such, these contribute to household production, not to GDP. This means that some remote instruction – where it is dependent on parental delivery or support – should not be counted towards our estimates of education output. Instead, the "ideal" approach to measurement would be to capture the component of remote learning that is delivered to students by teachers directly, without any more parental instruction than "normal".

The practical implementation of this conceptual "ideal" is a challenge. [3] We will adjust our simple activity metrics to take account of the weekly school attendances data that are available. This will count attending students in the same way as before school closures and will reduce education output considerably. We will also "count" learning from home towards our activity metrics, discounted first by the change in average teacher input and then by the proportion of instruction in the home that is dependent on parental support. This will push up education output.

These adjustments will be in place for the first estimate for Quarter 1 (Jan to Mar) 2020. The first captures the impact of school closures in March on education output. The second enables us to adjust "remote learners" full-time equivalency by a factor that reflects the conceptual factors outlined before. If there has been a reduction in the volume of teacher input, this would arguably reduce the level of education services provided per student, and the involvement of parents or guardians as effective substitute teachers provides a further discount on a full-time equivalent basis.

We will provide a further update upon publication. These approaches will likely require further improvement and assurance; consequently, they might be subject to larger than usual revision in future estimates.

Notes for: The treatment of non-market output in GDP

1. Our quarterly healthcare output estimates draw on a relatively aggregated breakdown of activities, comprising 12 different service areas. On an annual basis, we use a more detailed breakdown of activities and costs to estimate output more precisely, and we revise as required.

2. The treatment of the construction of the Nightingale hospitals in the UK National Accounts would in part depend on whether this was being carried out privately or publicly and the extent to which this was reflecting additional resource. The treatment of current and capital spend would be treated as government final consumption and government investment respectively.

3. It is worth noting that this approach makes no reference to the number of students who are choosing to take up provision online. We note that there is some evidence that a large fraction of students are not participating in this way. However, as we do not conventionally adjust to account for the rate at which students actively "participate" in lessons provided in school, we do not propose to do so during this period. We will keep this evidence under review.

5 . The treatment of the CJRS and SEISS in GDP

In response to the coronavirus (COVID-19) pandemic, the UK government has implemented the Coronavirus Job Retention Scheme (CJRS) and the Self-Employment Income Support Scheme (SEISS), which are likely to be the most significant fiscal interventions in terms of the direct impact on gross domestic product (GDP). We have taken an interim view on how the schemes should be treated in the national accounts and public sector finances, which reflects the latest international position. However, we recognise that this is still subject to further review and that the international consensus on the treatment of these schemes may change in the future. Early estimates will be made in line with the conceptual treatment outlined here, but we will update this position if required.

Table 1 provides an overview of these schemes and how these will be recorded in the UK National Accounts, which will be recorded as "other subsidies on production". We are continuing to work on classifying all of the government interventions, with information to be published as and when these are available.

Table 1: The Treatment of the Coronavirus Job Retention Scheme and Self-Employment Income Support Scheme in the UK National Accounts

	Government Intervention	Treatment in the National Accounts
Coronavirus Job Retention Scheme	Government to support employers maintaining their business, and keeping their employees on the payroll, with a view to having a quick return to production	Recorded as other subsidies on production from the government to the employer and payments of remuneration by employer to employees as wages and salaries
Self-Employment Income Support Scheme	Government support to self-employed with the view to supporting their business operations.	Recorded as other subsidies on production from the government to the self-employed and mixed income

Source: Intersecretariat Working Group on National Accounts

Coronavirus Job Retention Scheme

The Coronavirus Job Retention Scheme (CJRS) is in place to help employers whose operations have been severely affected by COVID-19, specifically with the aim to retain their employees. If employers are unable to maintain their current workforce, employers are able to "furlough employees and apply for a grant that covers 80% of their usual monthly wage costs, up to £2,500 a month, plus the associated Employer National Insurance contributions and pension contributions (up to the level of the minimum automatic enrolment employer pension contribution) on that subsidised furlough pay". Furloughed employees must not work for the employer during this period, while the CJRS payment is subject to Income Tax, National Insurance contributions and the minimum pension contributions.

It is employers, rather than the government, that determine who receives payments as furloughed workers. Employers gain from the government funding, which is one of the motivations behind the policy as production is able to return quickly once it allows it to recommence. This explains why it is recorded as other subsidies on production[1]. Employers are then expected to continue their payments of remuneration, which are still recorded as wages and salaries in line with it being liable to Income Tax, National Insurance contributions and pension contributions. The payment from employers to households continues to be classified as compensation of employees, specifically wages and salaries.

This subsidy on production offsets the recording of wages and salaries for those furloughed workers, thereby lowering total income. This also allows there to be a balanced concept of the CJRS – the output for those employers that furlough all their workers is zero, as is the income that is generated as part of this production process. As there is a cap on the CJRS payment, there may be instances where an employer voluntarily wishes to pay an additional remuneration to those furloughed employees. If so, compensation of employees would be higher to reflect that increase. This would now by reflected by an offsetting reduction in gross operating surplus (GOS), and the impact of furloughing would still be to lower income and output.

Self-Employment Income Support Scheme

The Self-Employment Income Support Scheme (SEISS) is aimed at those who are self-employed or a member of a partnership in the UK and have lost income because of COVID-19. It is possible to claim a taxable grant worth 80% of trading profits up to a maximum of £2,500 a month. Eligibility requires that trading profits do not exceed £50,000 and that more than half of recipients' total income is derived from self-employment. Unlike the CJRS, those in self-employment who receive the payment may continue to work or take on other employment including voluntary work.

Also unlike the CJRS, the motivation of the SEISS is not to maintain employees on the payroll. That said, its aim is to help enable a return to production as soon as possible – that is, it is also considered a subsidy on production where the beneficiary is still recognised as self-employed. The counterpart of a receipt of a subsidy is mixed income, rather than wages and salaries for employees. All else equal, mixed income will be reduced by less than would otherwise have been the case. The effect on mixed income from the reduction in production activity by the affected individuals will then be offset by the level of the subsidy.

Unlike the CJRS, it is not necessarily the case that the output for those in self-employment who receive the grant is zero, as there is scope to continue to take on working. That said, this would be a balanced concept – the level of any additional income would be in line with that additional output.

Notes for: The treatment of the CJRS and SEISS in GDP

1. It will be necessary to make an adjustment to the value of the subsidy on production and the number of hours worked so that consistent and coherent labour market statistics can be produced, which will then be reflected in estimates of labour productivity and unit labour costs.

6 . Practical challenges

Early estimates of gross domestic product (GDP) are subject to data revisions, reflecting the inherent trade-off between timeliness and accuracy of different data sources. As we incorporate more comprehensive information from a wide range of surveys and administrative records, those initial estimates are revised. Recent analysis has highlighted that while there has been an improvement in the quality of early estimates over time, revisions tend to be more pronounced around turning points (Figure 1). This reflects some of the statistical challenges we face in compiling estimates of GDP in real time at such points in the economic cycle.

Figure 1: Revisions between the first and "final" estimate of GDP growth

Five-period moving average of revisions to gross domestic product quarter-on-quarter growth, UK
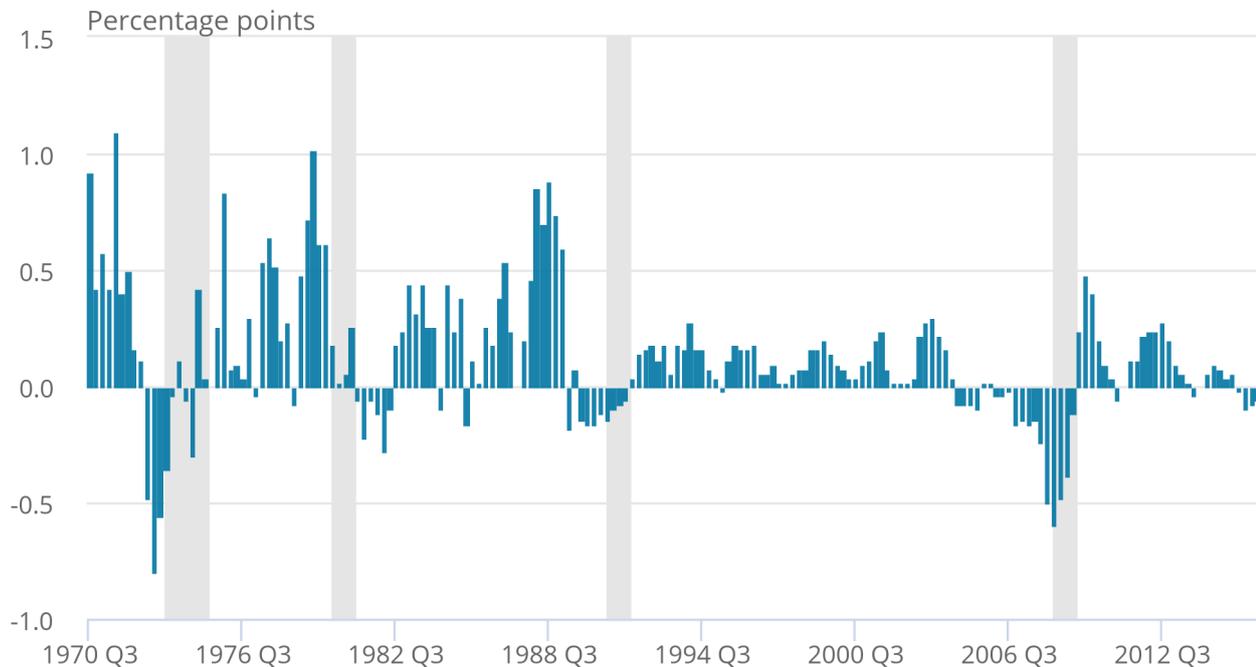
Source: Office for National Statistics – Communicating gross domestic product

Notes:

1. The revisions refer to those between the first estimate and the "final" estimate, considered here to be the one published three years later.

2. For the period Quarter 1 (Jan to Mar) 1970 to Quarter 4 (Oct to Dec) 2016, the MR is 0.13, the MAR is 0.50 and the MSR is 0.66. Revisions range from negative 2.4 percentage points to 3.6 percentage points.

3. A five-period moving average of revisions to gross domestic product (GDP) is taken from Quarter 3 (July to Sept) 1970 to Quarter 2 (Apr to June) 2016.

4. Q1 equals Quarter 1 (Jan to Mar), Q2 equals Quarter 2 (Apr to June), Q3 equals Quarter 3 (July to Sept) and Q4 equals Quarter 4 (Oct to Dec).

One of the recommendations from the [National Statistics Quality Review (NSQR) for the national accounts and UK Balance of Payments](#) was to carry out a review of how GDP estimates were compiled around the global financial crisis through 2008 and 2009. In particular, this would involve a study of "how the current quarterly and annual processes and procedures contributed to the larger than normal revisions for this period with a view to possible changes that might improve the performance during future cycles". In line with the [main findings](#) of the study into that period, we expect there to be statistical challenges over the coming months.

Typically, the first estimate has a relatively lower data content, reflecting the response rates we have to our business and household surveys[1] at that point of time. One challenge is that we need to consider how to handle output produced for part of the period before the business ceased production midway through the reporting period. There might be an increase in the number of businesses that cease to trade. For example, there is [recent evidence](#) during the coronavirus (COVID-19) pandemic that finds that around a quarter of companies have paused trading. We are looking to maintain response rates to our business surveys as much as possible, including moving our remaining paper-based surveys online, including for construction output, which moved online from April 2020.

We will focus resources on the main respondents and industries, looking at alternative collection methods. For example, the widespread disruption to the UK has introduced a number of constraints on operations that directly impact how we collect estimates of trade flows. This includes the International Passenger Survey (IPS), which comprises over 20% of our trade in services estimates. As IPS interviewers were recalled midway through March, our priority has been to find new ways to collect and report on the impact of COVID-19 on UK travel services. We have developed a statistical model that incorporates a range of data inputs, including the Monthly Business Survey (MBS) to ensure we cover the variety of data that the IPS is currently used for. This model is informing the travel services estimates published in our trade releases from May 2020. We will continue to refine the model as further data sources are identified.

Imputations and forecasts

A necessary feature of producing timely estimates is the need to impute for non-responses – that is, replace values that are missing because of non-responses. We impute a value for that non-response that reflects how that business has previously responded and how a business with similar characteristics has performed in the latest period. However, the challenge is that the characteristics of non-responding businesses may not be the same as those that respond, which could lead to bias – and this might be particularly problematic for specific components in the national accounts. For example, if there is a large increase in the number of businesses that permanently cease trading, then it would not be the case that respondents are representative of non-respondents. When a business does not respond to a survey, it is not possible from this alone to determine whether it has ceased trading and, if so, if this is permanent or temporary, particularly as current government initiatives allow for the furloughing of workers.

We will be undertaking a pilot study into "new" non-responses so that we are more informed of their impact. This will allow us to understand the business characteristics of non-respondents, which will help identify the extent to which this potential bias might be a concern. This will be complemented by undertaking online research to help provide more real-time insights into whether a non-respondent is continuing to trade and, if not, understand whether this is likely to be a permanent or temporary response.

We are also reliant on forecasts and other extrapolations[2] in producing timely estimates. However, some forecast models[3] may place too much weight on past performance and be less adept at picking up more timely information on the state of the economy, so we will need to make informed judgements that reflect any available information from a range of proxy indicators. We will be carrying out a review of all the forecast models in place, looking at how we can use the wider intelligence that is available and exploring options for making informed interventions to adjust forecasts. This will include the range of alternative indicators that have been developed, which have the potential to track the official concepts. For example, this may include how we may be able to reflect insights from our new [Business Impact of Coronavirus (COVID-19) Survey (BICS)](#) and other real-time indicators that may provide a more reliable signal at this time.

Seasonal adjustment

The purpose of seasonal adjustment is to allow meaningful comparisons between consecutive time periods, by estimating and removing systematic and calendar-related events that are associated with the time of the year and arrangement of the calendar. However, it is important to ensure that large shocks to the economy do not distort the estimation of such systematic calendar-related effects.

Best practice is to regularly review the specifications for seasonal adjustment to ensure they are relevant. During periods of significant economic change, it is important to review and make changes to seasonal adjustment specifications where new data are available. We will review our seasonal adjustment specifications regularly and make changes where it improves its quality, consistent with international guidance on the analysis of time series during the COVID-19 crisis.

Market output

In the UK, we produce estimates of volume gross value added (GVA) through single extrapolation – that is, GVA is extrapolated from the latest fully balanced year based on the volume growth of output. This relies on sales to be a proxy for output and in turn for GVA – or, equivalently, there being the same co-movements in sales, output and intermediate consumption. This is considered reasonable as an initial proxy in "normal" times of the economic cycle, but this may not be the case around turning points. In addition, for some businesses and/or industries, sales may have dropped to zero but they still have running costs like rental payments and energy, thereby leading to negative GVA.

There may be the potential to explore the available firm-level Value Added Tax (VAT) information, specifically on purchases, which may offer some further insights into the relationship between intermediate inputs and outputs that will help us produce a more informed picture of GDP. However, we expect that this will still be a challenge in producing real-time estimates.

Deflation

Changes in current-price estimates of GDP between any two periods reflect a price change and/or a change in the volume of economic activity. The process of deflation removes the effect of price changes, thereby producing the volume estimate. This requires information on the most appropriate business and consumer prices that are consistent with the national accounts' concepts of production and expenditure.

Price changes would be expected to respond to how the demand and supply of those goods and services will evolve in response to COVID-19. However, our ability to collect prices has also been impacted. Producer prices are collected through our in-house surveys and/or are provided by our external data suppliers, which are reliant on businesses providing regular price updates via postal questionnaire, although information is also collected via telephone entries. We are now considering alternative ways to contact sampled businesses to collect price data, such as via email. Where certain industries may be more impacted by potential low response, we will apply standard survey imputation methods and these will be flagged with quality markers to make users aware.

Approximately 45% of the basket for consumer prices is physically collected in stores in the UK. We have implemented arrangements to allow price collection from businesses and shops to be done remotely, while we are exploring other collection modes such as the processing of web-scraped information. Where appropriate, we will look to impute price changes based on other available information.

There are also some other conceptual challenges. For instance, it will be more challenging to capture the large price changes as well as changes in spending and production patterns. We will also have to consider the treatment of labour costs where these are considered a proxy of producer prices, given the context of furloughed workers.

Notes for: Practical challenges

1. Administrative information also feeds into the compilation of GDP. This is another challenge as staffing levels in supplier organisations may be affected and the same level of information may not be available.

2. Similar challenges will also be prevalent where interpolation takes place and where higher frequency estimates have to be produced from lower frequency inputs.

3. For instance, autoregressive integrated moving average (ARIMA) models are based on a relationship between an observation and a number of lagged observations, which removes trend structures.

7 . Publications

We are also incorporating changes to our publication regime, so that we respond in a more strategic manner towards a radically increased level of cross-cutting analysis to serve the needs of the UK. This will involve the suspension of the monthly publications of the statistical bulletins for the Index of Production (IoP) and Index of Services (IoS). However, our plan is to continue publishing the same level of information for these monthly output figures, while we will still produce a publication for monthly gross domestic product (GDP). We will continue to publish the Index of Construction, but we will temporarily cease producing the regional estimates as well as lower-level new orders estimates. This reflects quality concerns given the number of projects that have stopped, which would require additional analysis to determine the appropriate weights.

In addition, we will focus on publishing analytical articles each month alongside GDP that provide more focus on the main impacts of the coronavirus (COVID-19) at an industry level. Similarly, we will only now publish the data rather than a longer bulletin for Quarterly sector accounts, Consumer trends; Business investment in the UK; UK trade in services by partner country; UK trade in goods by industry; annual International trade in services; and annual Foreign direct investment involving UK companies.

8 . Conclusions

The latest expectations point to a significant decline in economic activity in the first half of this year at least, reflecting how the coronavirus (COVID-19) pandemic has led to a reduction in the demand for goods and services and the impact on the ability of businesses to supply those products as well as many businesses ceasing operating. The UK National Accounts provide a consistent framework to understand these impacts, and we have looked to explain how we might expect this to affect estimates of UK gross domestic product (GDP) this year.

National Statistical Institutes (NSIs) will face significant practical challenges in compiling GDP, which may lead to higher levels of uncertainty. We have explained the main issues that we expect to encounter and some of the steps that we are taking to help better understand and, where possible, tackle these challenges. We will continue to work with other NSIs and international organisations in looking to implement best practice in response to these challenges. The compilation of the UK GDP estimates will be monitored closely, as we look to ensure that we are able to capture the economic activity of the UK.

Additional information has been published on the challenges we face in compiling estimates of inflation and the labour market as well as how we are planning to respond to those. We will publish further articles in June that will cover how any theoretical and practical effects will be treated in the institutional sector accounts and UK Balance of Payments, including some of the other economic policy responses that have been implemented in response to COVID-19.

9 . Authors

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